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(72) Inventor  
Geoffrey William  
Alexander Neel  
(74) Agents  
Keith W. Nash and Co.,  
Pearl Assurance House,  
90-92 Regent Street,  
Cambridge CB2 1DP

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(71) Applicant  
Geoffrey William  
Alexander Neel,  
12 Holmead Road,  
London SW6

#### (54) Display systems

(57) A system and method is described by which items can be presented pictorially on a screen (20), either photographically and optically or using a VDU to allow selection by a prospective purchaser.

The system provides a random selector for randomly selecting items from a memory and a selector for selecting items from the memory according to logical derivation from information entered into the system and relating to customer, recipient if a gift is involved, price, type of goods required etc.

Related information from a second memory is simultaneously displayed.

Optical systems are described (Figures 8 and 9) for presenting images of transparencies on a screen as the main display.

Mechanics are shown (Figures 2, 4 and 6) for selecting between transparencies of transparency regions.

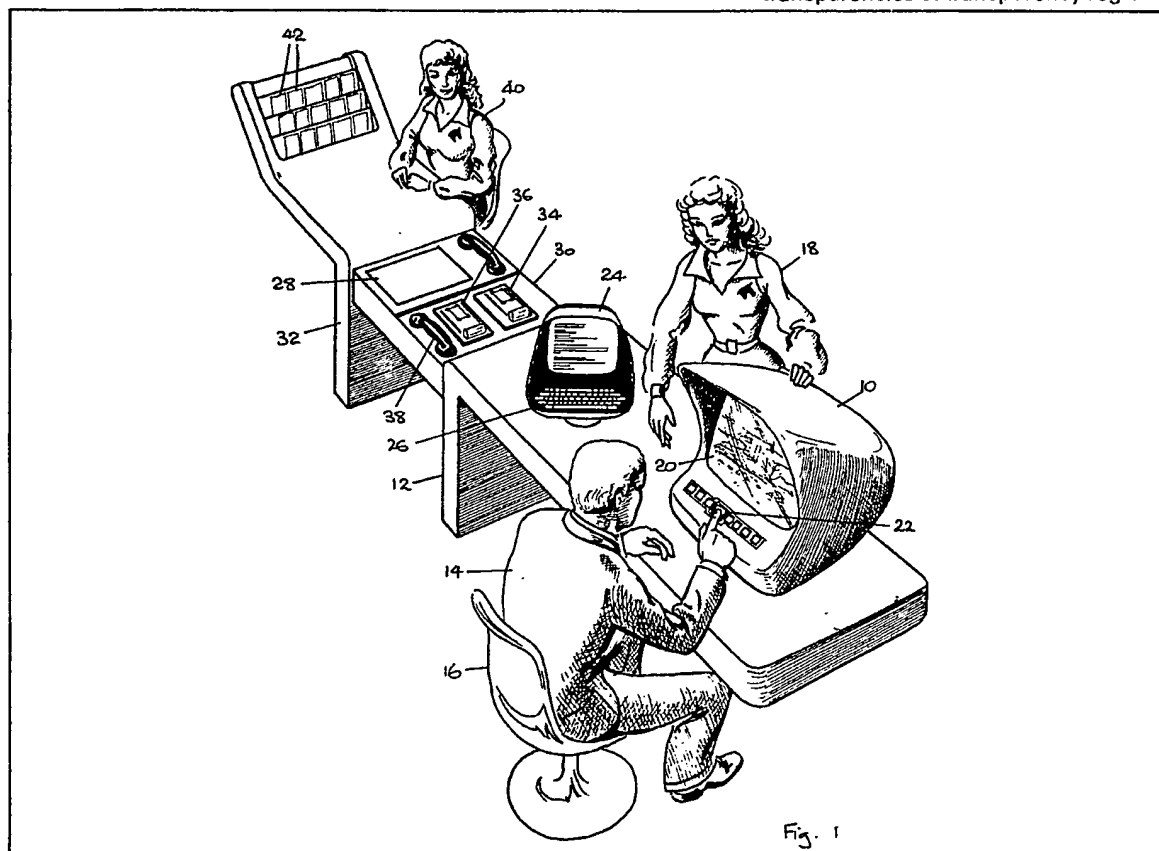


Fig. 1

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68%

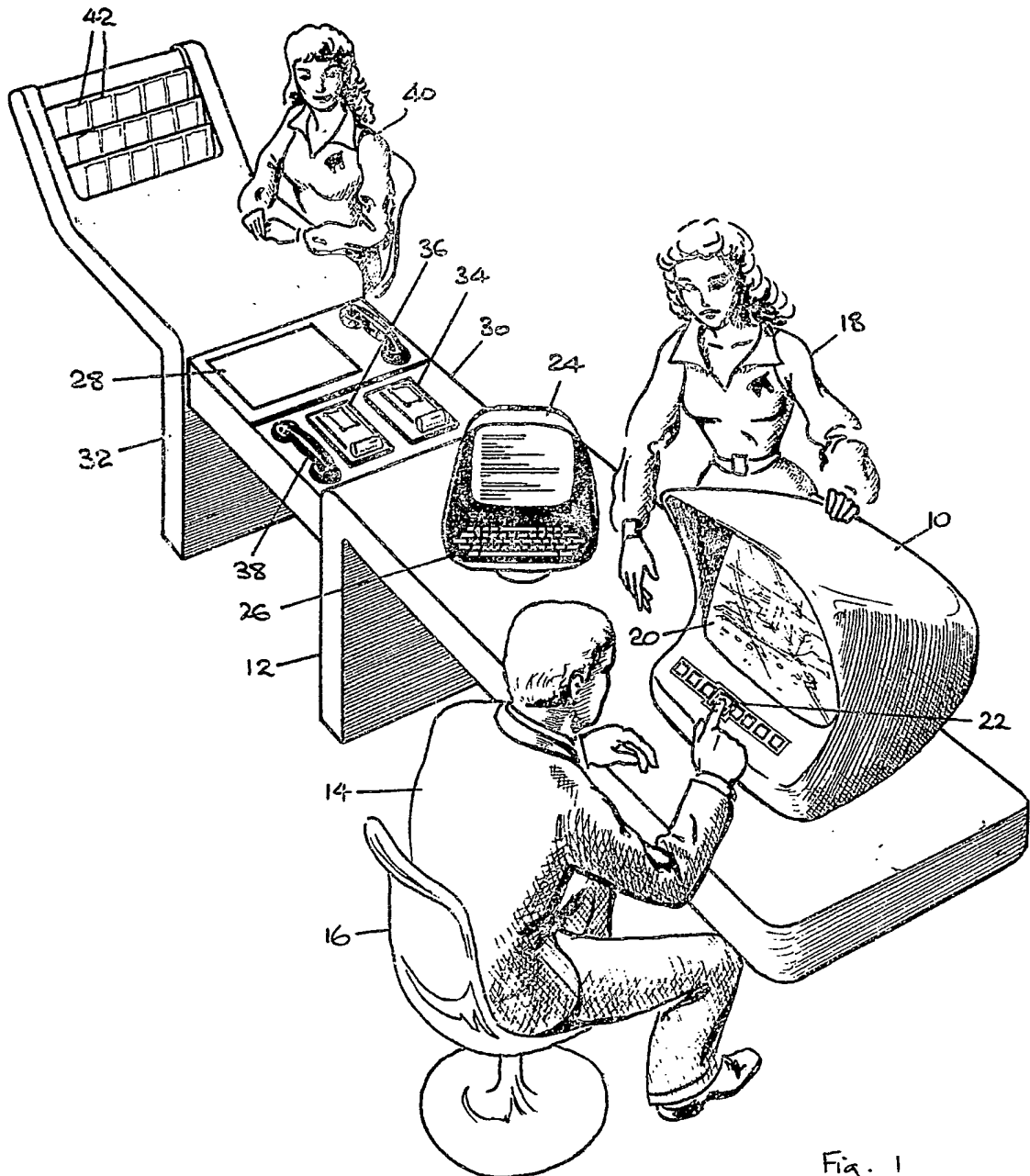


Fig. 1

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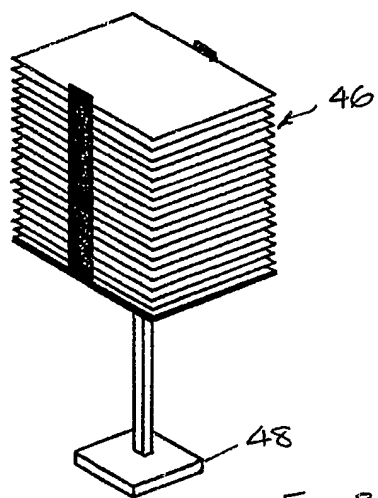


Fig 2

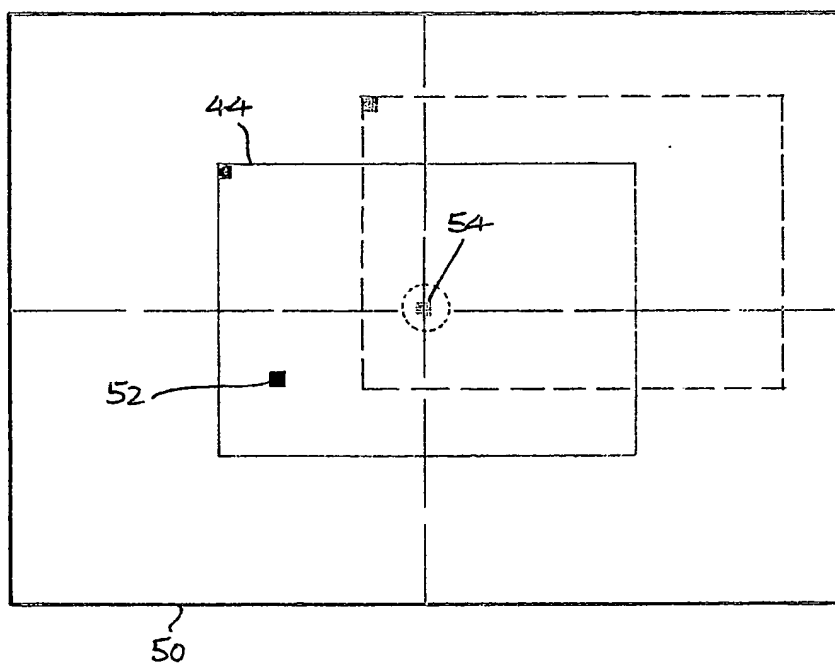


Fig 3

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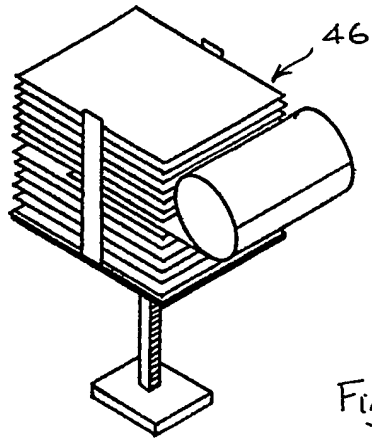


Fig. 4

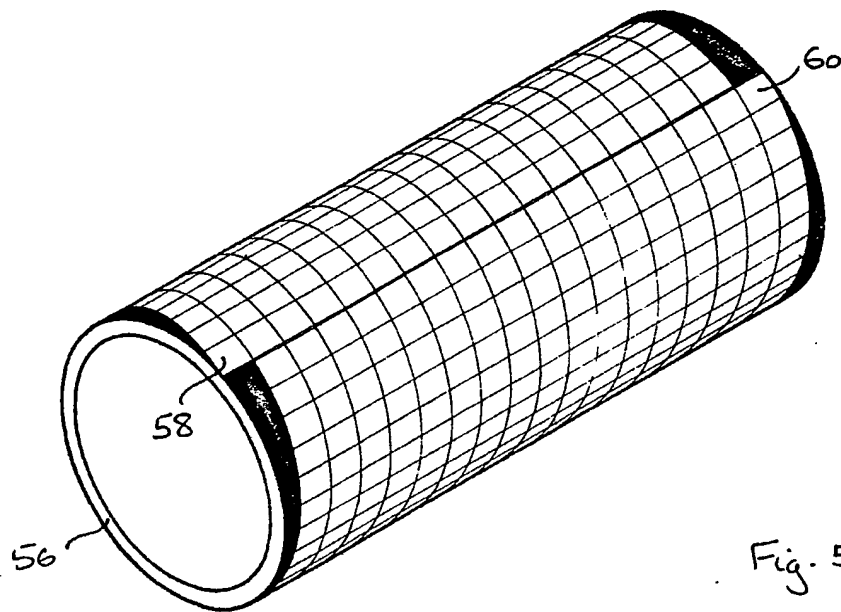


Fig. 5

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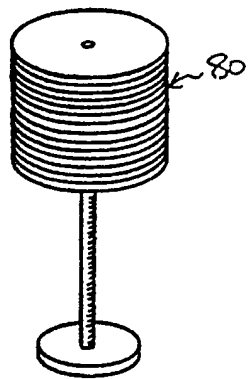


Fig 6

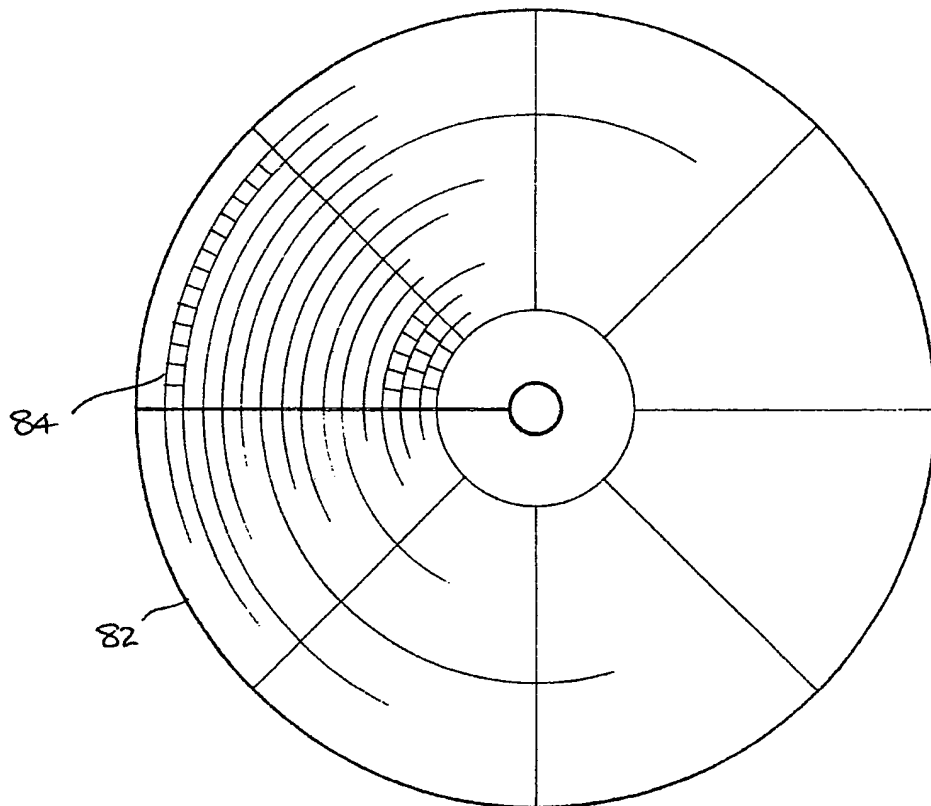


Fig 7

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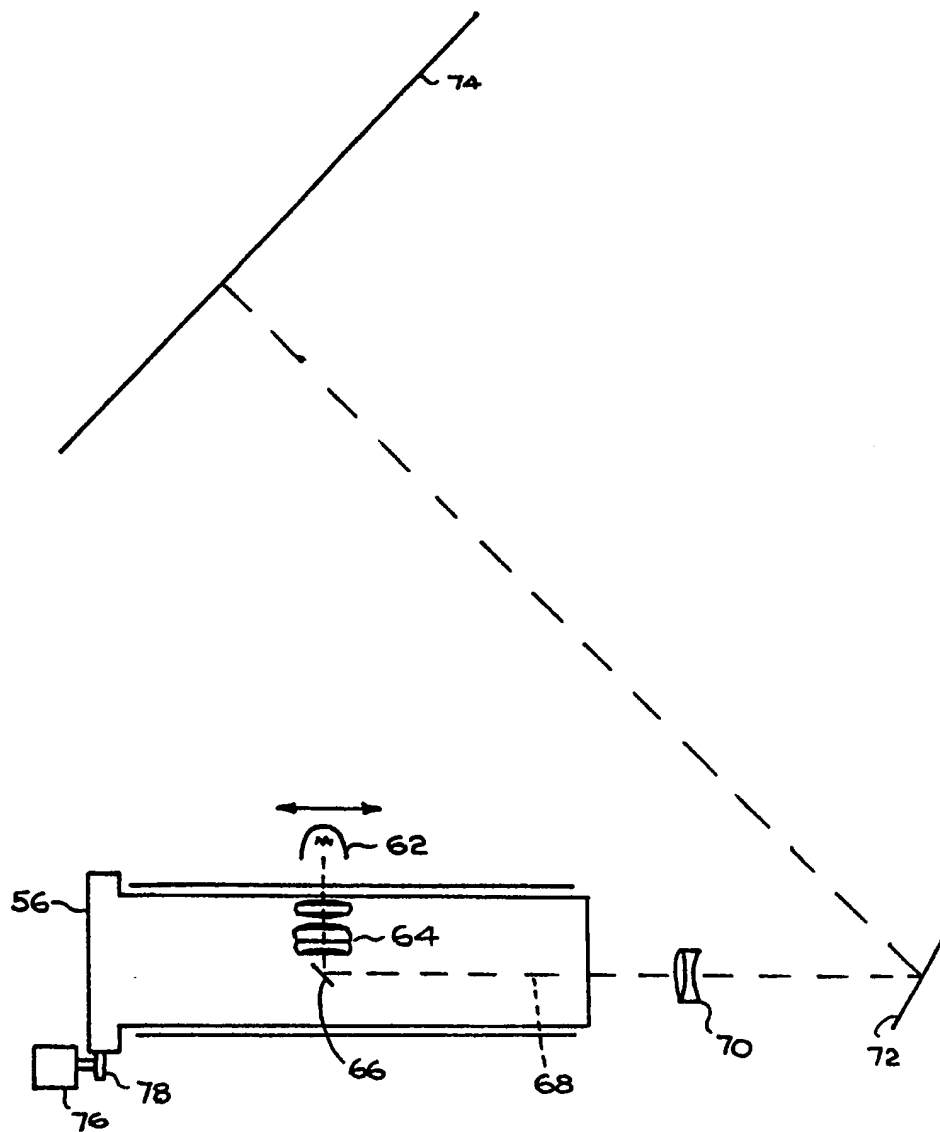


Fig. B

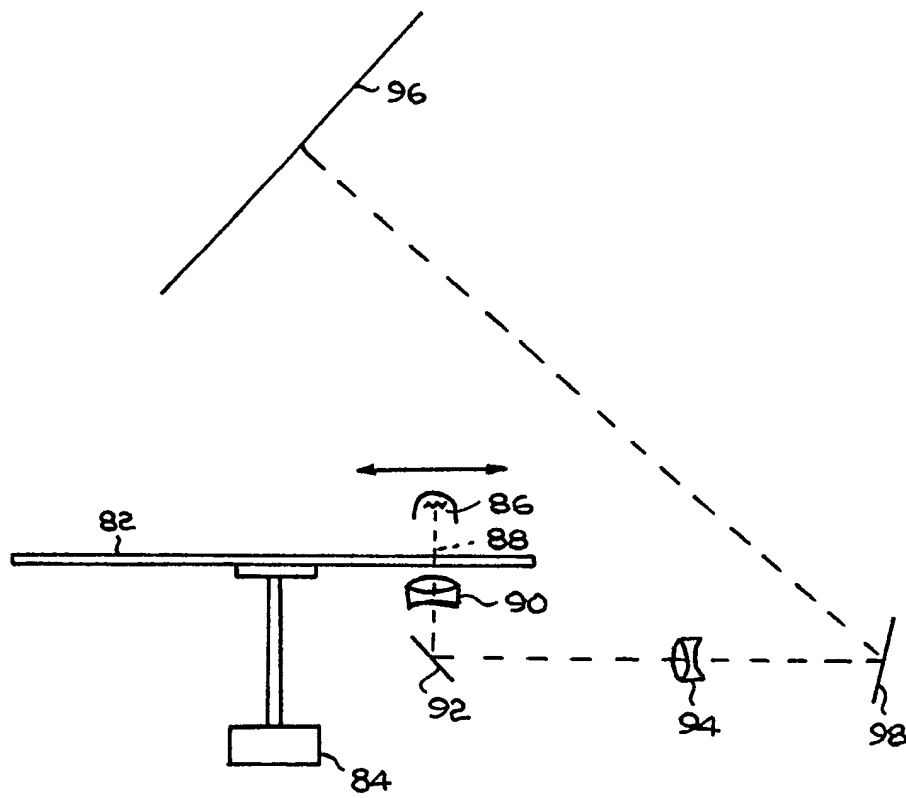
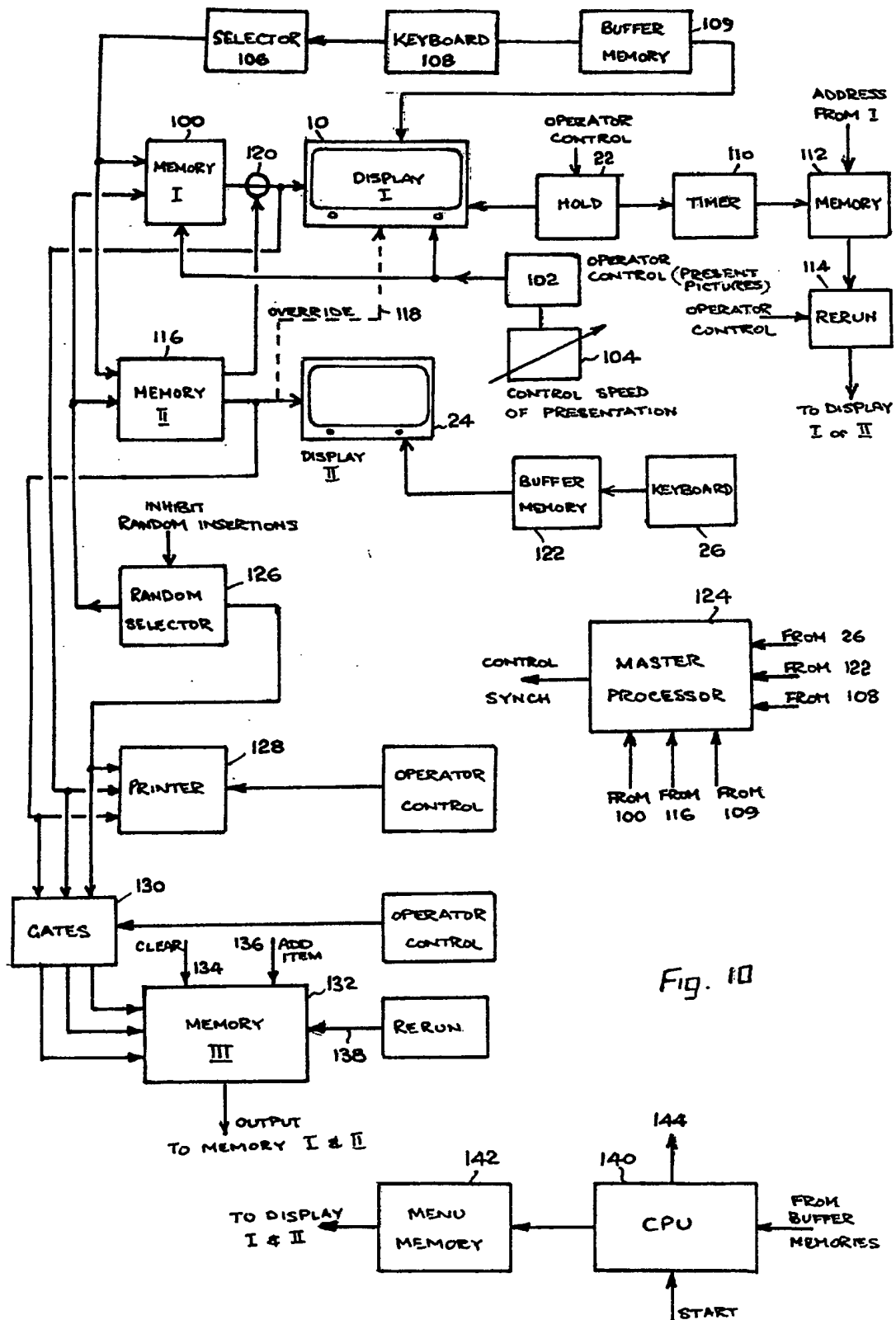


Fig. 9





## SPECIFICATION

## Improvements in and relating to display systems

5 This invention concerns display systems, particularly for displaying items for selection and purchase.

Conventionally items for sale have been displayed on a counter or in window or pictorially in a catalogue or series of pictures.

10 Where items for sale can be displayed themselves, selection can be immediate and straightforward as is the case in a conventional shop or store. Items having similar characteristics or coming under a similar heading will be grouped together within the display or store so that selection can be simplified and a prospective purchaser can readily locate items of different quality, price, type etc, from their physical position within the display or store layout etc.

There are many occasions when item selection 20 may be more complex. Thus, for example, where a purchaser is looking for a gift and wishes to reconcile factors such as price, availability, ease of packaging and transmittal, the factors determining the final choice may not follow any particular pattern and little or no assistance can be given to a prospective purchaser by layout or arrangement of a display or store. Consequently the selection of a gift may not always result from a rational selection procedure such as may occur in the selection of other goods for 30 purchase such as items for the personal use of the purchaser.

It is an object of the present invention to provide an improved system for presenting a prospective purchaser with items which he can select to purchase and which is particularly aimed at assisting a purchaser intending to purchase a gift.

It is another object of the present invention to provide an overall gift selection and delivery system in which one of the main difficulties associated with the 40 selection of gifts is obviated in that the overall system provides for the safe delivery of the selected gift after purchase direct to the intended recipient or to a destination selected by the purchaser.

It is intended that the invention will provide an 45 intending purchaser with a wider range and more logical choice of article for the intended recipient than known methods of presentation are likely to provide.

According to one aspect of the present invention a 50 system for displaying items and permitting selection of one or more thereof for purchase comprises

- 1) a first memory having a plurality of locations containing picture information of the said items and which can be addressed one at a time;
- 55 2) display means to which picture information from the first memory can be supplied for displaying in turn pictorial representations of the said items;
- 3) a secondary memory having a corresponding plurality of locations within which information relating to the said items is stored;
- 60 4) a second display means for visually displaying information from the second memory;

5) operator-controlled selection means for selecting a group of memory locations in one memory and 65 means for addressing corresponding locations in the other memory so that when an item is pictorially represented in the said display means the relevant information will be reproduced from the second memory on the second display means;

70 6) second operator-controlled selection means for designating a selected item from a sequence of displayed items;

7) non-operator controlled selector means for selecting from time to time from a special group of 75 memory locations, items for display in addition to those in the sequence of items from the said group, and

8) operator-controlled means for inhibiting said non-operator controlled selector means to inhibit the 80 insertion of items from the said special group.

The first memory may, for example, comprise a magnetic or video disc, magnetic tape or solid-state memory but is preferably in the form of projectable pictures or transparencies so that the pictorial representations of the said items can be obtained to a 85 high optical standard by illumination and magnification onto a suitable screen which then comprises the said display means.

The second memory may likewise, for example, 90 comprise magnetic disc or drum, magnetic tape, or solid-state memory and is preferably in the form of a magnetic disc or drum which can be updated with fresh information such as price, colour, availability etc, very quickly and which also can be accessed at 95 high speed for informing the prospective customer of a product in question.

Conveniently the first operator-controlled selection means comprises a keyboard and the said second display is a visual display unit associated with 100 the keyboard on which information from the second memory may be displayed.

Conveniently the second operator-controlled selection means comprises one or more push-buttons which can be operated by a person viewing 105 the said display means to allow the operator to indicate to the system that a particular item is of interest.

Preferably the rate at which different pictorial representations are presented from a group of pictures is adjustable by an operator using a further control 110 so that the operator is not presented with pictorial representations at a faster rate than he is able to absorb.

Preferably a third memory means is provided into which information is temporarily stored each time 115 the said second operator-controlled selector means is operated so that upon an appropriate command, information can be obtained from the said third memory means for identifying those pictorial representations of the items which have been indicated 120 by the operator as being of possible interest so as to allow the system to access the first and second memories quickly so as to re-display the pictorial representations of the items which have been indicated as being of interest to allow an operator to

have a "re-run" of those items indicated as being of interest to allow a final selection to be made.

Preferably the third memory is not cleared until such time as the final selection is made and if after a re-run, the prospective purchaser/operator is unable to make a final decision, preferably the third memory can have added to it further information relating to selected items so that the prospective purchaser can add to the stock of possible purchases further items before a final re-run and selection is made.

Preferably the pictorial representation of the items are arranged in natural groupings such as price, possible end user, function, availability, etc etc.

Where the first memory is made up of a large number of small photographic transparencies typically differently exposed regions of a larger sheet of photographic transparency material such as a microfiche.

Preferably the photographic transparencies are in colour and high quality photographic material is used so that high quality images can be formed by optical focusing and magnification using the transparencies.

An advantage of the system as described lies in the facility to up-date the information relating to price, availability etc, contained on, for example, a magnetic disc or magnetic drum with up-to-date information whilst retaining pictorial information relating to the items on the transparency memory.

According to a particularly preferred feature of this aspect of the invention, the information contained in the second memory may additionally include control signals which override the normal operations so as, for example, to prevent the illumination and display of pictures of items which are not currently available, are out of stock, or which cannot for some reason be imported to the country to which the customer has indicated that he wishes the goods to be sent. In this way a very up-to-date picture of what is available to the customer can be presented and goods which are denied to the customer are not presented so that no false hopes are raised during the selection procedure.

Preferably the second memory forms part of a computer which itself is programmed so as to derive from information supplied thereto by an operator, control signals for identifying likely groups of items within which a selection could arise from information supplied by the prospective purchaser.

Preferably the programmed computer is not itself accessible to the prospective purchaser but is under the control of a trained operator whose function is to enter into the computer information relating to the prospective purchaser, the prospective recipient where a gift is involved, details of the recipient and purchaser such as ages, relationship, sex, interests, geographical location, any disabilities, recreational pastimes etc etc.

According therefore to another aspect of the present invention, in combination with a system as aforesaid, there is provided a computer programmed to display a menu of questions in response to a first command, means for entering answers to the menu of questions by way of a keyboard or the like, means for deriving control signals from the answers

to the menu of questions for presenting either a further menu of questions for answer or an identification signal for one or more groups of items within the first memory to cause a display of items to begin in the display means for the prospective purchaser.

Although it is intended that the computer be under the control of a trained operator, it is to be understood that it is not essential and there is not reason why the computer should not be linked with a visual display unit and conventional typewriter keyboard accessible to the prospective purchaser who himself can then enter in answers to the menu of questions so that the whole selection procedure is under his control. However it is believed that in practice an arrangement in which a trained operator poses the questions and introduces a personal contact into the procedure will be to the mutual advantage of the prospective purchaser and the organisation or organisations aiming to supply the goods and services through the medium of the display system.

An important feature of the basic system of the invention is the provision of a non-operator controlled selector means for selecting from time to time from a special group of memory locations, items for display in addition to those in the sequence of items from the group which has been effectively selected by the operator or the prospective purchaser, perhaps as a result of the answers to a menu of questions thrown up by the computer or raised by the operator. This facility allows for the insertion into an otherwise organised and logical programme, a series of gift suggestions which follow no particular pattern as far as the prospective purchaser is concerned but may, for example, all lie within a given percentage excess of a stated price range for the intended gift or may all have some common factor which has been derived from the answers to the menu of questions and are intended to stimulate further ideas on the part of the prospective purchaser and are not geared to any particular price bracket.

The object of including this non-operator controlled selector is two-fold.

A. Some prospective purchasers may require a somewhat random stimulation to alternative ideas before they are able to make a final decision as to a gift for a particular recipient and the challenge represented by a series of relatively random suggestions for gifts may be just what is required to cause them to make a final decision with regard to a gift suggestion.

B. More importantly, a selling organisation may be encouraged to purchase space in the special group of memory locations to allow details of products from their own range of products to be inserted and presented to a prospective purchaser as options for consideration. In this way whether or not the purchaser has indicated a clear general choice of gift or not, he will nevertheless be presented with at least some items from the special group of memory locations and the organisation which has bought the special memory locations will therefore have a guaranteed exposure of its own line of products.

This exposure may be based on a time sharing as between memory locations which are dictated by the

particular requirements specified by the prospective purchaser and time spent in the special memory locations or on the basis that for every ten memory locations addressed as a consequence of a logical process derived from information given by the prospective purchaser so many memory locations in the special group of memory locations are then accessed.

There will be situations where the prospective purchaser does not wish for one reason or the other to be presented with a selection of items other than those which can be derived from a logical appraisal of the requirements stipulated by the prospective purchaser. In this event the purchaser or operator can inhibit the non-operator controlled selector means so that the pictures in the display will only relate to items which are of likely interest to the prospective purchaser having regard to the information he has already provided.

According to another feature of this aspect of the invention, the menu of questions may include a question asking the prospective purchaser whether or not he wishes to have presented to him random suggestions for a gift etc in addition to a logically derived range of gifts. If the answer is no, then the system can be inhibited as regards the non-operator controlled selector means and if the answer is yes, the the non-operator controlled selector means will be left fully functional.

According to another aspect of the present invention, a system incorporating any of the features as aforesaid may additionally include means for providing a personalised message to accompany the gift to the prospective recipient. To this end the apparatus may include a writing tablet or writing pad from which electrical signals can be obtained, for example by scanning so that a series of electrical signals corresponding to a personalised message handwritten by the purchaser can be derived for transmission to a remote location and re-assembly using a television screen or the like or may be used to control an automatic writing device for creating the personalised message on a card or sheet of paper or the like to accompany the gift. To this end the personalised message is transmitted to the nearest facility to the address of the recipient so that the card or paper on which the facsimile is formed is geographically close to where the gift is to be forwarded.

According to another aspect of the invention, the facility for displaying the items for selection preferably includes in association therewith or in close proximity thereto a display of greetings cards or the like which can be selected by the prospective purchaser and a code or other identifying symbol sent to the facility which is to deal with the wrapping and transmission of the gift to the recipient indicating the selected card so that the facsimile message from the purchaser can be imprinted on the card of his choice to be put with the gift.

In a fully automated facility, the representations of the cards may be contained in the first or second memory or in a supplementary memory for representation on the main display or on the supplementary display so that there is actually no need for the facility to hold a stock of such cards. On the

other hand where a gift is to be sent by the facility concerned direct it may be to advantage to have a stock of cards available for the purchaser to complete since there may be instances where the purchaser wishes the gift to be sent from the facility he is consulting in person where, for example, the facility is located at an airport and he is about to embark and wishes to send a gift to a host and hostess whom he has just left and are geographically still very close.

There is no reason why the facsimile device should not include provision for a facsimile reproduction of the purchaser's signature on the card to accompany the gift but for security reasons it may be deemed advisable not to encourage purchasers to sign their customary signature but to allow the name to be printed in block capitals so that there is no risk of the person's signature being applied to a document fraudulently.

Preferably the systems of the invention is embodied in a facility which may, for example, be a freestanding kiosk adapted to be located in railway stations, airport lounges, hotel foyers and the like and is divided into two operating sections.

a) A section where the purchaser consults the display screen, and  
b) a second section where personal details of the purchaser and details of the address of the recipient are obtained and where payment is effected typically using a credit card.

Preferably the facility includes a telephone link to allow for validation of credit cards and in a busy location preferably at least two operators are provided with the facility, one to handle the enquiries and demonstrate the range of goods available, and the other to handle the taking of personal details and securing payment.

One potential disadvantage of the system so far described is that the potential purchaser must have complete faith in that the system to believe that by paying money his request will be met and the gift will be delivered to the intended recipient reliably and safely. After a period of time, the general public will obviously come to recognise that the service, if backed up by reliability, is one which he can trust but particularly in the initial stages there could be market resistance on the basis that the exchange of money or credit card provides the purchaser with no tangible evidence other than a credit card receipt or the like that he has entered into any transaction and that the organisation which the facility represents has accepted any responsibility to delivery any particular goods on his behalf.

In order to overcome this possible credibility gap, a further feature of the invention lies in the provision of a printer or print-out device in association with the system for providing the purchaser with a printed record of the transaction which has been entered into.

The print-out may include his own name and address, the intended recipient's name and address and details of the goods which have been purchased.

According to a development of this feature of the invention, the printer or print-out device may include

facilities for producing an outline drawing of the article which has been purchased or alternatively and preferably a photograph which may be a colour photograph may be made of the illustration which has been presented to the purchaser on the screen of the display means and may be attached to or form part of the printed record of the transaction. In this way the purchaser will have a permanent record of the object which he has purchased and requested to be sent to the recipient together with details of the transaction.

Where the picture information to be displayed on the display means is stored on photographic medium and the pictorial representations are obtained by projection of light through the photographic medium and the forming of a focused image on an appropriate screen, the photographic transparencies which are to be projected may be arranged on a flat sheet or arranged around a cylindrical member or arranged around a disc so that a large number of small transparencies can be located conveniently in a manner which can be indexed rapidly using xy coordinates or radial and angular coordinates in the case of a disc or cylinder.

In a particularly preferred arrangement the transparencies are arranged in a generally rectilinear matrix on a flat sheet which can be rolled around a transparent cylinder having an axially located light source for illuminating same and the external surface around which the sheet is wrapped is slightly flared so that when wrapped therearound in contact therewith, the leading and trailing edges of the sheet just abut and do so in a staggered relationship such that the end of one line in the matrix aligns with the beginning of the next line down in the matrix at the junction of the two edges. In this way it is possible to scan each of the pictures by a simple linear movement of a scanning or optical system parallel to the axis of rotation and by rotating the drum containing the sheet containing the transparencies.

If the sheet was wrapped round a purely cylindrical drum so that the end of each line aligned with the beginning of the same line, then a continuous linear movement parallel to the axis of the drum would not be possible and a series of stepping movements of the optical device would be required as the end of each line of transparencies was reached.

As previously indicated, it is of significant advantage to store the pictorial information in a first memory and updatable information such as price, availability etc in another memory which can be more readily and cheaply updated than a pictorial memory. However it is necessary to be able to cross-reference between the two memories and to this end by arranging the photographs of transparencies in a regular array it is possible to index each picture position by coordinates and in this way only minimal numerate information is required for storage as an indexing mark on the other memory to allow any particular picture to be found from the information stored at the location in the second memory or, having found any particular picture, to read off the coordinate position of that picture and to then find a corresponding updatable information relating to that picture.

Thus, for example, an arrangement in which the pictures are arranged in rows of columns in a rectilinear array on a flat sheet, each picture can be identified by quoting the row and column numbers and these two numbers can be used as the identifying index mark for the updatable information in, for example, a disc or drum memory or solid-state memory associated therewith.

Where the numerate information relating to the rows and columns of the pictorial information is not suitable as an identifier for a computer-type memory then a look-up table may be provided which gives the appropriate index identifying information for the computer memory from the numerate information relating to any particular picture.

Where the pictures are arranged on a disc, a similar two-number identifier may still be used to identify the position of any picture thereon provided the transparencies are arranged in annular rings of fixed radius. Using one radius of the disc as a datum point, the circular movement of the disc from the datum to the position around one of the annular rings of pictures is a first measure of the picture position and is expressed in degrees or radians and the number of the annular line measured either from the centre of the disc or from the perimeter of the disc is the other number information relating to the picture position on the disc.

Where the pictures are arranged in a cylindrical surface in a series of axially parallel rows and perpendicular columns, the position of any particular transparency picture can be identified by the angular rotation of the cylindrical surface from a datum position to the row containing the desired picture and the number of positions along the row at which the picture is located measured from one end or the other of the cylinder.

According to a preferred aspect of the invention, where an optical system is employed to image a photographic representation of the item, the optical system is preferably stationary and all movement is effected by moving the card or sheet or disc of material containing the pictures. In this respect, the use of a flat sheet tends to require a larger overall space for such an arrangement since the area over which the sheet may have to be moved to allow registry with any point on the sheet is at least four times the area of the sheet. A more condensed arrangement is one in which the sheet is wrapped around a cylindrical surface or is in the form of a disc.

Where curvature of the surface containing the pictorial information is inevitable, the optical system can include appropriate correcting elements to remove any distortion in the resulting image.

Where it is essential to move the optical system, for example to traverse axially along a cylindrical surface, rotation of the drum securing the other movement, the optical system includes a movable lens for forming an image at infinity and a fixed light-collecting lens for receiving light therefrom so that movement of the first lens, for example along the length of the cylinder, does not alter the magnification of the final image.

The visual representation of the item is of paramount importance since an inferior pictorial rep-

resentation will tend to dissuade the potential purchaser from proceeding. According therefore to another feature of the invention, the optical representation of the object is preferably in colour and may be a three-dimensional representation using polarised light and beam splitting facilities so that the viewer apparently sees light from two points or integral photography may be employed where the interlace may be at the screen.

- 5 Since the choice of gift may be a rather personal matter, the viewing position of the pictorial display is preferably such that the prospective purchaser is the only person who can see what is in the display.

Where the second memory displays information on a supplementary screen such as a television screen the latter may be angled so that it can be seen by the operator only or may be movable so that it can be seen either by the operator or by the prospective purchaser or both.

- 20 According to a further aspect of the invention, the information relating to price, availability etc, of any particular product may be displayed both in the display associated with the second memory and also in or close to the display means containing the pictorial representation of the item concerned. In this way the prospective purchaser may be presented with all the information he needs about the product on the same screen.

In an alternative arrangement the information relating to price, availability etc may only become visible in the display showing the pictorial representation of the item after a control has been operated by the prospective purchaser so that this information is only made available in respect of those items which interest the purchaser.

According to another feature of the invention, the pictorial information relating to the items to be displayed may be stored in a plurality of separate sub-stores each of which is identified by as relating to a particular range of goods or interests or ages etc. Thus one sub-store may relate to gardening goods, another to flowers, another to foodstuffs, another to alcoholic beverages etc. Other sub-stores may include a range of items which might be of interest to a young unmarried person, another to a young married person, another to a young married mother with small children, another to an older woman etc, with similar sub-stores for young men etc.

By providing a series of questions in the form of a menu which have to be answered as a preliminary procedure, so the ancillary computer can derive an indication of those sub-stores which are likely to contain pictorial information of interest to the prospective purchaser and control signals may be developed by the computer accordingly to identify the sub-stores required.

Where the sub-stores constitute separate physical entities such as sheets of film containing a large number of separate transparency pictures, the entities are stored in such a manner that the control signal will locate the position of the entity concerned and move into an operative position in the optical path of the projection equipment.

Movement of the projection equipment may be automatic or may be under the control of an

operator which may be either the facility operator assisting in the sale or the prospective purchaser himself.

According to a preferred feature the display in which the pictorial representation appears may include a control operable by the prospective purchaser which after a particular picture has been seen is pressed or otherwise operated so as to effect a picture change.

Preferably the picture change is automatic and preferably the picture change is automatic so that from time to time the non-operator controlled selector means can present pictorial representations from the said special group of memory locations except when the non-operator controlled selector means has been inhibited.

According to a further feature of the invention, preferably the display means always illustrates something in the display which may be either an advertisement indicating the service provided by the system and the facility in question or may be a continually changing sequence of pictorial representations of items from the said special group of memory locations so that as soon as a prospective purchaser approaches the facility, he is subjected to pictures of items which he could purchase and which might just give him inspiration for a gift.

Where highly accurate registration of pictures on, for example, a sheet of film is required, a position sensing device operating on Moire fringes and a fixed grating may be used to allow the precise position of the medium containing the pictures to be established from a given datum position or to allow the precise position of the optical system when the latter is movable to be determined.

In a further development of the invention, memory locations in a distant computer data base may be accessed using a television or telephone land-line link to allow centralised information to be displayed along with information from the local memory. In this way special day to day bargain offers may be made or special prices or local offers made which would not be applicable long-term. This would be particularly appropriate where, for example, fresh foodstuffs or fresh flowers were involved, which would not normally be available except in a short local season.

According to a further aspect of the invention, a further supplementary memory may be provided, typically in the form of a video disc or video-tape containing information which will provide a moving picture display on a television screen or on another screen by way of television projection. By storing a short sequence of moving picture information relating, for example, to a hotel and holiday location, a prospective purchaser may feed more inclined to purchase the holiday as a result of seeing a moving picture version of the location, hotel etc, than would be the case from a series of still pictures such as envisaged from the basic first memory.

Since the system is intended to include a visual display unit including a television screen, the provision of this additional feature only involves the additional memory and decoding equipment together with necessary search facilities to locate the approp-

riate information on the disc or on the tape.

The additional facility would not apply to the majority of items but would only apply to those types of items which warranted a moving picture display.

Preferably the information in the first memory which is to be displayed pictorially is arranged such that pictures of items of substantially the same price are located adjacent one another in the memory so that a simple step-by-step movement through the memory from a given starting point will involve inspection of a range of gifts under the general heading all of roughly the same price. Preferably specific price bands are earmarked in the memory so that gifts of, say, more than £5 and less than £10 are earmarked by a first code, gifts between £10 and £15 by another code etc, and as part of the interrogatories the prospective purchaser is asked to specify some approximate guide as to price so that a sensible starting point in the programme of pictures can be arrived at by the assistant or by the equipment.

Where the items are price-indicated, preferably a coding is associated with each picture in the memory which is read off by a reading device so that a control signal is generated to arrest an ongoing display of pictures beyond a price band limit.

According to a further feature of the invention where the presentation of pictorial representations of items is automatic, the purchaser may be provided with the control to override the automatic picture change and hold any particular picture. Where this facility is provided, a timing device may be associated with the hold control and information stored in an intermediate memory indicating the index mark of those pictures which have been held and the length of time each picture has been held. By providing logic circuit means for determining an order for re-presentation of the pictures which have been held and the identities of which have been stored, so, if recall of these stored pictures is requested, the order in which the pictures are recalled and the length of time they are displayed in an automatic sequence may be dictated by the length of time stored for the original hold of each picture. Thus, for example, those pictures which were held for longer are preferably left till later in the re-presentation of pictures so that the purchaser is presented with the picture which he considers longest last in the review.

Preferably the number of pictures which can be stored for review is limited to n such as ten or twelve and a warning signal is generated when the hold control has been operated that number of times and the prospective purchaser is asked whether at that stage he wishes to have a review of those which he has considered so far in order to make a final decision or whether he wishes to see a further range of pictures of items thereby losing those which have already been considered.

In order to allow the prospective purchaser to review the whole of a series of pictures presented to him, a complete running record in a further short term memory may be provided of the identities of all pictures and informations presented to the prospec-

tive purchaser so that if necessary the purchaser can have a re-run of the whole of the series of pictures once again either to see all of the pictures or to find and reexamine one or two of the originally selected ones.

Where the system includes an operator/assistant the system preferably includes a second display albeit on a smaller scale in which the operator/assistant can see the same pictorial representation that is being presented to the prospective customer. Typically the additional display for the operator/assistant is back-to-back with the display provided for the customer.

According to a broader aspect than the said one aspect of the invention a system for displaying items and permitting selection of one or more thereof for purchase but which does not include non-operator controlled selection of items comprises

- a) a first memory having a plurality of locations containing picture information of the said items and which can be addressed one at a time;
- b) display means to which picture information from the first memory can be supplied for displaying in turn pictorial representations of the said items;
- c) a second memory having a corresponding plurality of locations within which information relating to the said items is stored;
- d) a second display means for visually displaying information from the second memory;
- e) operator-controlled selection means for selecting a group of memory locations in one memory and means for addressing corresponding locations in the other memory so that when an item is pictorially represented in the said display means the relevant information will be reproduced from the second memory on the second display means; and
- f) second operator-controlled selection means for designating a selected item from the sequence of displayed items.

The first and second display means may be one and the same display.

Preferably, however, the first and second display means are separate and the second display means comprises a television-based visual display unit.

According to another aspect of the invention a method of displaying items permitting selection of one or more thereof for purchase comprises the steps of

- i) addressing a plurality of locations in a first memory one at a time each of said locations containing picture information of the said items to be displayed;
- ii) displaying pictorially the picture information relating to the said items in turn;
- iii) simultaneously addressing corresponding locations in a second memory having a corresponding plurality of locations within which information relating to the said items is stored;
- iv) displaying information from each addressed location in the said second memory so that information relevant to the pictorial representation is displayed in the second display, and
- v) manually designating a selected item from the sequence of displayed items for the purpose of purchase or further consideration.

The aforementioned method may be modified by from time to time introducing into the displays pictorial representations and information of other items from a further memory so as to present in the display items which may prove to be attractive to the prospective purchaser and would not have been presented to the purchaser from the information contained in the first and second memories.

According to another aspect of the invention a method of storing information relating to items which are then to be represented to a prospective purchaser for selection and possible purchase comprises the steps of

- storing in an optical memory pictorial information relating to each item, the pictorial information relating to each item being located at unique addressable locations within the memory,
- storing in a supplementary memory at equally addressable and uniquely identifiable locations information relating to each of the items for which pictorial information is stored in the first memory and upon demand addressing the two memories simultaneously so as to present in a first display pictorial information relating to an item and in a second display information relating to the item such as price, availability etc.

Conveniently the second memory may be a magnetic memory such as a magnetic disc or drum or length of magnetic tape.

Preferably the second memory is readily updatable.

The invention will now be described by way of example with reference to the accompanying drawings in which

Figure 1 is a perspective view of a typical installation for performing the invention;

Figure 2 illustrates how a stack of flat photographic sheets each containing a plurality of transparency pictures may be stacked for withdrawal one at a time;

Figure 3 shows how an extracted sheet can be moved relative to a fixed optical axis to illuminate and project a picture;

Figure 4 shows a similar stack of photographic sheets which can be rolled for projection;

Figure 5 shows to a larger scale such a sheet rolled around a tapering cylindrical member;

Figure 6 shows a stack of discs each of which can be withdrawn in turn;

Figure 7 shows one of the discs to an enlarged scale;

Figure 8 shows the optical system needed to project a picture from a cylindrically wound sheet,

Figure 9 is a similar view showing how pictures can be projected from a disc,

Figure 10 is a block diagram of one embodiment of the invention.

In Figure 1 a display unit 10 is mounted on a first desk unit 12 and is available for inspection by a prospective purchaser 14 for whom is provided a seat 16. A sales girl 18 stands behind the desk 12 and instructs the purchaser.

The display unit includes a screen 20 and a series of control buttons of which the most important is designated 22. Pressing this button holds the picture

on the screen 20 until the button is released.

Also on the desk unit is a visual display unit (VDU) 24 and associated computer keyboard 26 by which the sales girl 18 can enter certain information in reply to a menu of questions to the prospective purchaser.

Although not shown a computer is contained within the VDU 24 and control signals are generated by the computer and conveyed to the picture display 10 to initially select an appropriate memory device within the display device 10 and then to display selected regions of the memory device.

Where the selection is a gift for a third party, the customer is invited to write his own personal message on a pad 28 and the latter is transmitted to a facsimile printer at a remote location from where the gift is to be delivered to the recipient so that a personalised message apparently written in the handwriting of the customer can accompany the gift.

It is assumed that payment for the purchase will normally be made by means of credit cards or the like and a further facility is provided in the bridging section 30 between the desk unit 12 and a second desk unit 32 for receiving credit cards and the like.

Two such stations are shown at 34 and 36 and a telephone link is conveniently provided for validating the transaction with the credit card company if needed.

The second desk section is attended by a second sales girl 40 and after selecting the gift the customer is transferred to the second sales girl so that the selection facility is released for another customer. The writing of the message on the pad 28 and the completion of the credit card transaction and the selection of a gift card on which his message is to be written at the far end may then be performed under the guidance of the second sales girl 40. To this end the latter is provided with a bank of specimen gift cards such as 42.

The pictorial representation are obtained from photographic transparencies contained for example in a rectangular sheet of photographic material 44 as shown in Figure 3. A stack of such sheets 46 is shown in Figure 2 and by elevating the stack through a controlled distance by means of a control platform 48, so any one of the sheets in a stack may be presented to a withdrawal mechanism for moving the sheet into an active position in a centre of a platform 50.

Where the first transparency to be viewed is, for example, located at the point marked 52 the sheet or platform or both is moved until the transparency 52 occupies the central position denoted by reference numeral 54 at which a static beam of light and optical system associated therewith forms an enlarged in-focus image of the transparency on a screen back-projection.

In Figures 4 and 5 an alternative arrangement is provided for which the sheet 44 withdrawn from the stack 46 is rolled around a tapering cylindrical member 56 (see Figure 5). The transparencies are arranged on the sheet in a rectilinear matrix and when the sheet is wrapped around the cylindrical member 56, the rows of the matrix align as shown so as to form a continuous helix of pictures from a start-



ing point 58 to a finishing point 60.

Figure 8 shows an optical system capable of illuminating and forming a focussed image of any one of the transparencies around the cylinder. To this end a light source 62 which is movable, together with a first lens assembly 64 within the cylindrical member 58 along a line parallel to the axis of the cylinder. Below the lens assembly 64 is mounted a mirror 66 which moves therewith and is angled so as to project the beam of light 68 out through a second lens assembly 70 onto a further mirror 72 from which it is deflected onto a screen 74.

By arranging that the light between the two lens assemblies 64 and 70 is parallel movement of the lens and mirror assembly 64 and 66 along the axis of the cylinder 56 will not alter the magnification or focus of the final image on the screen 74.

Rotation of the member 56 is effected by means of a motor 76 driving the cylinder 56 through a non-slip drive 78 such as a toothed wheel and pinion.

Any point on the cylindrical surface can be specified by an angular rotation of the cylinder 56 and a linear displacement of the lens and mirror and lamp combination 62, 64, 66 relative to the cylinder.

Figures 6 and 7 show how pictures can be stored on a series of discs which are stacked at 80 and which are removable in turn for illumination and projection. One such disc is shown at 82 in Figure 7 and here individual transparencies such as 84 are arranged in annular rings at different radii across the surface of the disc.

Movement of an optical projection system radially relative to the disc will allow it to align with any one of the annular tracks and rotation of the disc will allow any one of the frames in the track to be aligned with the optical axis of the projection system.

Figure 9 shows an optical system for projecting an image from a transparency region on a disc 82 which is rotated by a motor 84. To this end a light source 86 projects a beam of light 88 through the disc and through a lens arrangement 90 and mirror 92. The light source, lens and mirror move radially of the disc and the light from the lens 90 is parallel so that when picked up by another lens 94 an in-focus image but enlarged can be formed on a screen 96 after being reflected from a mirror 98.

Figure 10 is a block diagram of a system containing many of the features so far described as features of the invention.

The main display of Figure 1 is likewise identified by reference numeral 10 and the subsidiary display by reference numeral 24. The other items common to Figure 1 are the HOLD control 22 and the keyboard 26.

The display 10 receives signals from a memory 100 which is addressed by a control circuit 102 which includes provision for adjusting the rate at which pictures are to be presented on the display 10 (control 104), and also by a selector 106 itself controlled from a keyboard 108 and associated buffer memory 109. The keyboard may be a full keyboard such as 26 or may be a series of controls as shown on display 10 in Figure 1.

The HOLD control 22 is operative when the apparatus is in "automatic display mode" - i.e. posi-

tions in memory 100 are addressed in turn under the control of the selector 106. Pressing the HOLD control holds the displayed picture. Timer 110 notes how long it is held and commits the time to memory 112 together with address information of the picture from memory 100.

RERUN will cause the pictures to be displayed in a sequence determined by the programming of the RERUN control circuit 114. Typically those HELD for the longer times are displayed for correspondingly longer periods of time during the rerun and are left to the end of the rerun.

A memory 116 contains information such as price, availability etc. of the items "pictorially" stored in memory 100. As such 116 is typically a floppy disc, magnetic tape or solid state memory allowing fast access and fast update.

Signals from 116 are displayed on the second display 24 and may be channelled to the display 10 by dotted path 118. Inhibit signals from 116 are supplied to a gate 120 (or direct to the memory 100 or to the display 10) to stop the display of items not available or out of stock etc.

A keyboard 26 and buffer memory 122 allow information to be supplied to the display 24.

A master processor 124 receives signals from *inter alia* 26, 122, 108, 109, 100 and 116 and supplies control signals depending on the programme and the input signals, to control all the functions and timing, sequencing etc. of the various parts of the system.

In accordance with the invention a "random selector" is provided in the form of a selector circuit 126 which can be inhibited by operator control and provides address statistics to the memory 100 addressing circuits to cause "random" locations in the memory 100 to be read and pictures thereat displayed on the display 10.

The outputs of 100, 116 and 126 are available to a printer 128 which under operator control (and/or central control from 124) will provide a print out of a transaction with or without pictorial representation of the item(s) purchased.

Signals from 100, 116 and 126 are also supplied via a gate complex 130, also under operator control to a memory 132 to allow a rerun of all items presented during an automatic mode. The memory 132 can be cleared by a signal 134 and if further addresses etc. are to be added, by ADD signals 136. A return signal 138 causes the memory locations to be read out control signals sent to memories 100 and 116 to cause the pictures and information to be represented on the displays 10 and 24.

In automatic or semi auto modes of operation, the preliminary initiating of the system involves the pressing of a START control to give a start signal to a CPU 140 (which may be part of the unit 124). This causes the memory 132 to be cleared, and a "menu" memory 142 to be addressed to produce in the display 10 (or 24) a set of questions. Answers are keyed in using the appropriate keyboard 108 (or 26) and stored in the buffer memory 109 (or 122).

After all the questions have been answered the CPU 140 produces a control signal 144 which initiates the desired programme from within 124 and causes selectors 106 and 126 (if required) to become



active either under automatic mode using controls 102 and 104 allowing pictures to be held by depressing the HOLD control 22 or in manual mode, where the operator changes from one picture to the next by depressing a "picture change" control forming part of the "keyboard" 108.

#### CLAIMS

1. A system for displaying items and permitting selection of one or more thereof for purchase comprises
  - 1) a first memory having a plurality of locations containing picture information of the said items and which can be addressed one at a time;
  - 2) display means to which picture information from the first memory can be supplied for displaying in turn pictorial representations of the said items;
  - 3) a second memory having a corresponding plurality of locations within which information relating to the said items is stored;
  - 4) a second display means for visually displaying information from the second memory;
  - 5) operator-controlled selection means for selecting a group of memory locations in one memory and means for addressing corresponding locations in the other memory so that when an item is pictorially represented in the said display means the relevant information will be reproduced from the second memory on the second display means;
  - 6) second operator-controlled selection means for designating a selected item from a sequence of displayed items;
  - 7) non-operator controlled selector means for selecting from time to time from a special group of memory locations, items for display in addition to those in the sequence of items from the said group, and
  - 8) operator-controlled means for inhibiting said non-operator controlled selector means to inhibit the insertion of items from the said special group.
2. A system according to claim 1 wherein said first memory comprises a plurality of projectable pictures or transparencies pictorial representations of which are obtainable by illumination and magnification onto a screen which screen comprises the said display means.
3. A system according to claim 1 wherein the second memory comprises a magnetic storage medium device and means is provided for updating the information stored therein at high speed.
4. A system according to claim 1 wherein the first operator-controlled selection means comprises a keyboard and the said second display is a visual display unit associated with the keyboard on which information from the second memory is displayed.
5. A system according to claim 1 wherein the second operator-controlled selection means comprises one or more push-buttons which can be operated by a person viewing the said display means to indicate to the system that a particular item is of interest.
6. A system according to claim 1 wherein the rate at which different pictorial representations are presented from a group of pictures is adjustable and a further control is provided for making said adjustment.

7. A system according to claim 1 further comprising a third memory means into which address information is temporarily stored each time the said second operator-controlled selection means is operated, and command means is provided by which address information stored in the third memory means can be extracted to identify the addresses of those pictorial representations of the items which have been indicated by the operator as being of possible interest so as to allow the system to access the first and second memories quickly and re-display the pictorial representations of those items which have been indicated as being of interest.
8. A system according to claim 7 wherein means is provided for clearing the third memory after a final selection has been made.
9. A system according to claim 1 wherein the pictorial representations of the items are arranged in groups dictated by some or all of the following, namely price, possible end user, function and availability.
10. A system according to claim 1 wherein the first memory is made up of a large number of small photographic transparencies comprising a plurality of differently exposed regions of a larger sheet of photographic transparency material.
11. A system according to claim 1 wherein the information contained in the second memory may additionally include control signals for overriding and inhibiting the illumination and display of pictures of items which are not available to the purchaser.
12. A system according to claim 1 wherein the second memory forms part of a computer which itself is programmed so as to derive logically from signals derived from information supplied thereto by an operator, control signals for identifying groups of items having characteristics dictated by information supplied thereto by the prospective purchaser.
13. A system according to claim 12 wherein the programmed computer is not itself accessible to the prospective purchaser but is under the control of an operator and is adapted to receive information relating to the prospective purchaser, and where a gift is involved, details of the intended recipient.
14. A system according to claim 1 further comprising in combination therewith a computer programmed to display a menu of questions in response to a first command, means for entering answers to the menu of questions by way of a keyboard or the like, means for deriving control signals from the answers to the menu of questions for presenting either a further menu of questions for answer or an identification signal for one or more groups of items within the first memory to cause a display of items to begin in the display means for the prospective purchaser.
15. A system according to claim 1 wherein an initial display contains a menu of questions which includes a question asking the prospective purchaser whether or not he wishes to have presented to him random item suggestions in addition to a logically derived range of items, and the system is adapted to respond to a negative reply in a manner to inhibit the non-operator controlled selection

means.

16. A system according to claim 1 further comprising message means for providing a personalised message to accompany a gift selected from the displayed items.

17. A system according to claim 16 in which the message means comprises a writing tablet from which electrical signals are obtained by scanning so that a series of electrical signals corresponding to a personalised message handwritten by the purchaser is derived for transmission to a remote location to control an automatic writing device to reproduce the handwritten message on a card to accompany the gift.

18. A system according to claim 1 wherein the facility for displaying the items for selection is proximate to a display of greetings cards or the like one of which can be selected by the prospective purchaser, and card-identifying information is transmitted to the facility which is to deal with the wrapping and transmission of the gift to the recipient to indicate the selected card type so that the facsimile message from the purchaser can be imprinted on a card of his choice.

19. A system according to claim 1 wherein information from which representations of cards can be obtained is stored in a memory for representation of the main display or on the supplementary display.

20. A system according to claim 1 when embodied in a free-standing kiosk adapted to be located in railway stations, airport lounges, hotel foyers, shops and the like and is divided into two operating sections:

a) a first section where the purchaser consults the display screen, and

b) a second section where personal details of the purchaser and details of the address of the recipient are obtained and where payment is effected typically using a credit card.

21. A system according to claim 20 wherein the kiosk includes a telephone link to allow for validation of credit cards.

22. A system according to claim 20 further comprising a printer in association with the kiosk for providing the purchaser with a printed record of the transaction which has been entered into.

23. A system according to claim 22 wherein the printer is adapted to produce a representation of the article which has been purchased.

24. A system according to claim 23 wherein the representation is a colour photograph of the illustration which has been presented to the purchaser on the screen of the display means.

25. A system according to claim 1 wherein the picture information to be displayed on the display means is stored on photographic medium and the pictorial representations are obtained by projection of light through the photographic medium and the formation of a focused image on a screen, and

wherein the photographic transparencies which are to be projected are arranged around a rotatable member such as a cylindrical member or a disc, and means is provided for indexing the rotatable member and aligning therewith an optical system so as to allow rapid selection of different pictures.

26. A system according to claim 25 wherein photographic transparencies are arranged in a generally rectilinear matrix on a flat sheet which is rolled around a transparent cylinder having an axial light source for illuminating same and the external surface around which the sheet is wrapped is a frusto-conical surface so that when the sheet is wrapped therearound in contact therewith, the leading and trailing edges of the sheet just abut and do so in a staggered relationship such that the end of one line in the matrix aligns with the beginning of the next line down in the matrix at the junction of the two edges, the pictures are scanned by linearly moving an optical system parallel to the axis of rotation and by rotating the drum.

27. A system according to claim 25 wherein the optical system is stationary and the rotatable member is the only item which moves.

28. A system according to claim 25 wherein the optical system is caused to traverse axially relative to a cylindrical surface with rotation of the drum securing the other movement required for selection, the optical system includes a movable lens for forming an image at infinity and a fixed light-collecting lens for receiving light therefrom so that movement of the first lens, along the length of the cylinder, does not produce changes in the magnification of the final image.

29. A system according to claim 1 wherein the optical representation of the object is in colour.

30. A system according to claim 1 wherein the optical representation of the object is a three-dimensional representation using polarised light and beam-splitting facilities so that the viewer apparently sees light from two points, or integral photography may be employed with interlace at the screen.

31. A system according to claim 1 wherein the pictorial display is viewable only by the prospective purchaser.

32. A system according to claim 1 wherein the second memory displays information on a supplementary screen such as a television screen.

33. A system according to claim 32 wherein the supplementary screen is only viewable by the operator.

34. A system according to claim 32 wherein price and availability information relating to any particular product is displayed both in the display associated with the second memory and also in or close to the display means containing the pictorial representation of the item concerned.

35. A system according to claim 32 wherein price and availability information only becomes visible in the display showing the pictorial representations of the item after a still further control has been operated by the prospective purchaser so that this information is only made available in respect of those items which interest the purchaser.

36. A system according to claim 1 wherein the pictorial information relating to the items to be displayed is stored in a plurality of separate sub-stores each of which is identifiable as relating to goods having a particular common characteristic.

37. A system according to claim 36 wherein the

sub-stores constitute separate sheets of film, each containing a large number of separate transparency pictures, and the sheets are stored in such a manner that a control signal will locate the position of the sheet concerned and move it into an operative position in the optical path of the projection equipment.

38. A system according to claim 1 wherein the display in which the pictorial representation appears includes a still further control operable by the prospective purchaser which, after a particular picture has been viewed, is operated so as to effect a picture change.

39. A system according to claim 1 wherein the picture change is automatic.

40. A system according to claim 39 wherein the non-operator controlled selection means presents pictorial representations from the said special group of memory locations unless the non-operator controlled selection means has been inhibited.

41. A systems according to claim 1 further comprising means for causing the display means always to show something in the display such as an advertisement indicating the service provided by the system and the facility in question or a continually changing sequence of pictorial representations of items from the said special group of memory locations.

42. A system according to claim 1 in which the pictorial representations are obtained by optical enlargement of pictures on film, and a position sensing device operating on Moire fringes and a fixed grating is employed to allow precise position of the film containing the pictures to be established from a given datum position, or to allow the precise position of the optical system when the latter is movable to be determined.

43. A system according to claim 1 in which memory locations in a distant computer data base are accessed using a television or telephone land-line link to allow centralised information to be displayed along with information from a local memory.

44. A system according to claim 1 wherein a further supplementary memory is provided, typically in the form of video disc or video-tape containing information which will provide a moving picture display on a television screen or on another screen by way of television projection.

45. A system according to claim 1 wherein the presentation of pictorial representations of items is automatic, and control means is provided for the purchaser to override the automatic picture change and hold any particular picture, and a timing device is provided associated with the hold control and picture address and time information derived from the timing device is stored in an intermediate memory so as to provide a list of pictures which have been held and the length of time each picture has been held, and logic circuit means is provided for determining the order in which pictures which have been held are to be redisplayed, wherein the order in which the pictures are redisplayed and the length of time they are displayed in a subsequent automatic sequence is dictated by the length of time stored for the original hold of each picture, and those pictures which were held for longer are left till later in the

representation of pictures so that the purchaser is presented towards the end of the review with the pictures which he considered longest, in the pre-review.

46. A system according to claim 45 wherein the number of pictures which can be stored for review is limited to  $n$  and a warning signal is generated when the hold control has been operated  $n$  times and the display is adapted to display a question as to whether at that stage the purchaser wishes to have a review of those which he has considered so far in order to make a final decision or whether he wishes to see a further range of pictures of items thereby losing those which have already been considered.

47. A system according to claim 46 wherein a complete running record in a short term memory is provided of the identities of all pictures and informations presented to the prospective purchaser so that a purchaser can have a re-run of the whole of the series of pictures once again.

48. A system according to claim 1 further comprising a second display for an operator/assistant the same pictorial representation that is being presented to a prospective customer.

49. A system for displaying items and permitting selection of one or more thereof for purchase but which does not include non-operator controlled selection of items comprises:

a) a first memory having a plurality of locations containing picture information of the said items and which can be addressed one at a time;

b) display means to which picture information from the first memory can be supplied for displaying in turn pictorial representations of the said items;

c) a second memory having a corresponding plurality of locations within which information relating to the said items is stored;

d) a second display means for visually displaying information from the second memory;

e) operator-controlled selection means for selecting a group of memory locations in one memory and means for addressing corresponding locations in the other memory so that when an item is pictorially represented in the said display means the relevant information will be reproduced from the second memory on the second display means; and

f) second operator-controlled selection means for designating a selected item from the sequence of displayed items.

50. A system according to claim 49 wherein the first and second display means are one and the same display.

51. A system according to claim 49 wherein the first and second display means are separate and the second display means comprises a television-based visual display unit.

52. A method of displaying items permitting selection of one or more thereof for purchase comprises the steps of

i) addressing a plurality of locations in a first memory one at a time each of said locations containing picture information of the said items to be displayed;

ii) displaying pictorially the picture information relating to the said items in turn;

- iii) simultaneously addressing corresponding locations in a second memory having a corresponding plurality of locations within which information relating to the said items is stored;
- 5 iv) displaying information from each addressed location in the said second memory so that information relevant to the pictorial representation is displayed in the second display, and
- v) manually designating a selected item from the
- 10 sequence of displayed items for the purpose of purchase or further consideration.

53. A method according to claim 1 in which from time to time there is introduced into the display pictorial representations and information of other items  
15 from a further memory so as to present in the display items which may prove to be attractive to the prospective purchaser and would not have been presented to the purchaser from the information contained in the first and second memories.

20 54. A method of storing information relating to items which are then to be represented to a prospective purchaser for selection and possible purchase comprises the steps of

- storing in an optical memory pictorial information relating to each item, the pictorial information relating to each item being located at unique addressable locations within the memory,
- storing in a supplementary memory at equally addressable and uniquely identifiable locations
- 30 information relating to each of the items for which pictorial information is stored in the first memory and upon demand addressing the two memories simultaneously so as to present in a first display pictorial information relating to an item and in a second
- 35 display information relating to the item such as price, availability etc.

55. A system for displaying items and possibly selection of one or more thereof for purchase constructed and arranged substantially as hereinbefore  
40 described with reference to and as illustrated in the accompanying drawings.

56. Apparatus for displaying items and permitting selection of one or more thereof for purchase constructed and arranged substantially as hereinbefore  
45 fore described with reference to and as illustrated in the accompanying drawings.

57. A method of displaying items and permitting selection of one or more thereof for purchase substantially as hereinbefore described with reference  
50 to and as illustrated in the accompanying drawings.